

Second Five-Year Review Report
for
Hastings Ground Water Contamination Site
Adams County
Hastings, Nebraska

July 2002

Prepared by

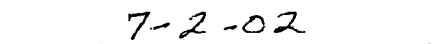
Region VII
United States Environmental Protection Agency
Kansas City, Kansas

Approved by:



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Date:



Five-Year Review Report

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List of Acronyms

ARARs	Applicable or Relevant and Appropriate Requirements
BNRR	Burlington Northern Railroad
BTEX	Benzene, toluene, ethylbenzene, and xylene
CD	Consent Decree
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CMS	Community Municipal Services
COCs	Contaminant(s) of Concern
EE/CA	Engineering Evaluation/Cost Analysis
EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Differences
FS	Feasibility Study
HEIP	Hastings East Industrial Park
HGWCS	Hastings Ground Water Contamination Site
ICA	Institutional Control Area
IWA	In-well Aeration
MCL	Maximum Contaminant Level
NAD	Naval Ammunition Depot
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NDEQ	Nebraska Department of Environmental Quality
OSWER	Office of Solid Waste and Emergency Response
O&M	Operation and Maintenance
OU	Operable Unit(s)
PAH	Polyaromatic Hydrocarbon
PRP	Potentially Responsible Party
RA	Remedial Action
RD	Remedial Design
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RPM	Remedial Project Manager
SVE	Soil Vapor Extraction
TBCs	To Be Considered
ug/l	Microgram/Liter
USACE	United States Army Corp of Engineers
VOCs	Volatile Organic Compounds

Executive Summary

This document presents the U.S. Environmental Protection Agency's (EPA's) second Five-Year Review of the Hastings Ground Water Contamination Site (HGWCS), located in and adjacent to the city of Hastings, Nebraska. The results of this Five-Year Review indicate that some of the actions taken to date continue to provide protection to the public health and the environment. For the actions which have not yet been fully implemented, a protectiveness determination cannot be made at this time until further information is obtained. Further information will be obtained by the receipt of ground water report(s) which the responsible parties are preparing for EPA. Several responsible parties continue to be active in the implementation of response actions at various locations across the site. For the most part, the ownership of involved properties and the list of responsible parties have not changed since the last Five-Year Review. These parties, the EPA and the state of Nebraska, have conducted and continue to conduct actions at the site to address contamination in the site soils and ground water.

The HGWCS was divided into seven subsites for investigative and remediation purposes on the basis of geographic and constituent source area characteristics. The subsites include the Former Naval Ammunition Depot (NAD), FAR-MAR-CO, North Landfill, South Landfill, Second Street, Colorado Avenue, and Well #3. The Area-Wide Ground Water Action is a separate operable unit (OU19) and addresses contamination present at, and migrating from, all the subsites but the NAD that is not being captured by subsite actions. The Area-Wide Ground Water Action does not include contamination emanating from the NAD. EPA has worked closely with the state of Nebraska, the Army Corp of Engineers (USACE), and a number of potentially responsible parties (PRPs), including the city of Hastings, to address the issues that have affected the public health and environment at this site. These actions are briefly described below.

Area-Wide Ground Water Action - The Agency has taken an Area Wide approach to the six subsites located within or directly adjacent to the city limit of Hastings. This approach integrated the information collected at each subsite into a comprehensive strategy that evaluated remedies protecting potential receptors from unacceptable risks posed by contaminated ground water. The EPA issued an interim action Record of Decision (ROD) for Operable Unit (OU) 19 on June 24, 2001, and is currently negotiating with the responsible parties to perform the work identified in the ROD. The ROD provides for ground water monitoring and a number of institutional controls, including actions in support of a city ordinance that controls the use of ground water in the areas of contamination. The USACE is addressing the former NAD subsite located a considerable distance outside the city. The USACE has completed a separate Five-Year Review Report and has not been included as part of the recent Area-Wide Ground Water Action because they will conduct a NAD ground water action.

Well #3 Subsite - The EPA completed one interim action addressing the contamination present in the soils, one soil removal action, two interim actions addressing the ground water contamination and one final action selected to address the ground water

contamination. The EPA released its final ROD for the subsite on May 17, 2001, selecting no further action for OUs 07, 17, and 13. For OU18, the final ROD selected the continuation of the operation of the former municipal supply well M-3 with maximum contaminant levels (MCLs) as the cleanup goal. The EPA continues to work with the responsible party to complete this work effort.

Colorado Avenue Subsite - The PRPs installed an intermediate/deep level (e.g., 60 to 100 feet below ground surface) soil vapor extraction (SVE) system for OU01 (source control) and continue to operate it on a periodic basis. Construction and implementation of a shallow level (e.g., less than 50 feet below ground surface) SVE system is planned for the summer of 2002. For OU09 (ground water), the PRPs installed the extraction and treatment system for Phase 1. In 1998, EPA amended the ROD and changed the remedy to air sparging and in-well stripping. The ground water action continues but has not been fully implemented. Phase 1 and Phase 2 are in operation and Phase 3 is in design.

Second Street Subsite - The EPA initiated ground water and soils (SVE) removal actions at the source area in 1997. Operations of these systems continue. In 2001, a down gradient ground water removal action consisting of an in-well stripping system was initiated. A Feasibility Study (FS) is being developed to support issuance of a ROD in the summer of 2002. No ROD has been issued to date.

North Landfill Subsite - The PRPs implemented the source control (OU10) remedial action consistent with the 1991 ROD. The EPA approved the remedial design (RD) for the remedial action, a landfill cap, in 1995. The city of Hastings completed construction of the cap in 1999 and monitored the levels of contamination present in the soil-gas quarterly for eight quarters (from 1999 to 2001). The city of Hastings performed the soil-gas monitoring and continues to maintain the landfill cap. In March 1995, the responsible parties requested that EPA delay the implementation of the ground water extraction and treatment remedy selected in the 1991 ROD in order to determine if the remediation system implemented at the FAR-MAR-CO Subsite would address the North Landfill plume. The EPA agreed to a 5-year suspension for the implementation of the remedial action as long as quarterly ground water monitoring was performed to verify the performance of the FAR-MAR-CO system. The FAR-MAR-CO extraction system was implemented in 1997. The 5-year performance period will end in July 2002 and the report evaluating the FAR-MAR-CO remediation system should be submitted to EPA in 2003. The clean up level for the ground water OU (OU10) at the North Landfill is the 1×10^{-4} excess cancer risk level (i.e., the level expected to result in 1 excess cancer per 10,000 population) for site related contaminants.

FAR-MAR-CO Subsite - The EPA issued the ROD for the FAR-MAR-CO OU03 (source control) in 1988 selecting SVE as the remedy. In August 1995, the EPA amended the ROD by extending the SVE operation for two years beyond the time which the soils had reached their cleanup levels. This extension was implemented to remove the contamination present in the upper zone of the aquifer, thereby facilitating the restoration

of the aquifer. The work is being conducted by Farmland Industries, Inc. under a Consent Decree (CD). The SVE system began its operation on November 19, 1997. The extended operation and maintenance (O&M) phase of the system began in May 2000 and will be completed in May 2002. Farmland Industries, Inc. operates and maintains the system with limited monitoring.

The EPA released an Action Memorandum in December 1995 for OU06 (ground water). Morrison Enterprises, the responsible party, installed the extraction well in the summer of 1997. On a quarterly basis EPA receives from Morrison Enterprises ground water monitoring results for the contaminants of concern (COCs) (carbon tetrachloride {CCl₄} and ethylene dibromide {EDB}). System operation information is also included in the quarterly reports. The MCLs are the performance goals.

South Landfill Subsite - The EPA issued its final ROD for OU05 (source control and ground water) in September 2000. The responsible parties are performing pre-design studies for the landfill cap and will complete a full-scale design within the next year. Negotiations of a CD are expected to begin this fiscal year. The CD will require full-scale design and implementation of the cap. The EPA will be evaluating the effectiveness of natural attenuation to address ground water contamination.

NAD Subsite - The USACE is performing the work for the following OUs 04, 08, 14, 15, and 16. The USACE completed its Five-Year Review for OU 04 and found the remedy to be protective of human health and the environment. The USACE will perform the Five-Year Review for the remaining OUs (08, 14, 15 and 16) separately. Appendix 1 is a copy of that report.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site name (from WasteLAN): Hastings Ground Water Contamination Site		
EPA ID (from WasteLAN): NED980862668		
Region: 7	State: NE	City/County: Hastings/Adams
SITE STATUS		
NPL status: <input checked="" type="checkbox"/> Final <input type="checkbox"/> Deleted <input type="checkbox"/> Other (specify)		
Remediation status (choose all that apply): <input checked="" type="checkbox"/> Under Construction <input checked="" type="checkbox"/> Operating <input checked="" type="checkbox"/> Complete		
Multiple OUs? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	Construction completion date: Not attained	
Has site been put into reuse? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO, site use not affected		
REVIEW STATUS		
Reviewing agency: <input checked="" type="checkbox"/> EPA <input type="checkbox"/> State <input type="checkbox"/> Tribe <input type="checkbox"/> Other Federal Agency		
Author name: Diane Easley, Darrell Sommerhauser, Victor Lyke, Paul Doherty		
Author title: Remedial Project Manager	Author affiliation: US EPA	
Review period: 04/1997 to 04/2002		
Date(s) of site inspection: 03/20/2002		
Type of review: <input checked="" type="checkbox"/> Statutory <input type="checkbox"/> Policy (<input type="checkbox"/> Post-SARA <input type="checkbox"/> Pre-SARA <input type="checkbox"/> NPL-Removal only <input type="checkbox"/> Non-NPL Remedial Action Site <input type="checkbox"/> NPL State/Tribe-lead <input type="checkbox"/> Regional Discretion)		
Review number: <input type="checkbox"/> 1 (first) <input checked="" type="checkbox"/> 2 (second) <input type="checkbox"/> 3 (third) <input type="checkbox"/> Other (specify)		
Triggering action: <input type="checkbox"/> Actual RA Onsite Construction at OU07 <input type="checkbox"/> Actual RA Start at OU____ <input type="checkbox"/> Construction Completion <input checked="" type="checkbox"/> Previous Five-Year Review Report <input type="checkbox"/> Other (specify)		
Triggering action date (from WasteLAN): 05/27/1997		
Due date (five years after triggering action date): 05/27/2002		

Five-Year Review Summary Form, cont'd

Issues:

Well #3: no issues. Colorado Avenue: issues regarding effectiveness of ground water remedy and potential downgradient plume. Second Street: ROD to provide for additional action to address downgradient ground water contamination not yet released. North Landfill: ground water report due in 2003 will determine if additional response actions are needed. If EPA determines ground water remedial action is necessary, the Agency will negotiate a Consent Decree covering the RD/remedial action (RA) for that work. FAR-MAR-CO: ground water report due in 2003 will determine if additional response actions are needed. If EPA determines that additional ground water remedial actions are necessary, the EPA will release its ROD for that work and will negotiate a Consent Decree for RD/RA. South Landfill: a Consent Decree to be negotiated to provide for RD/RA. RA not yet implemented. Area Wide: Interim Action ROD issued in 2001, city passed ordinance for institutional control, remaining components of remedy have not been implemented. NAD: see Appendix 1.

Recommendations and Follow-Up Actions:

Continue the actions as specified in the subsite RODs or Action Memorandums. Evaluate the information generated from the collection and analysis of quarterly ground water sampling. Determine if additional actions are needed to be protective of human health and the environment.

Protectiveness Statements(s):

For Well #3 OUs 07, 13, and 17; Far-Mar-Co OU11; North Landfill OU10; and NAD OU4 - the remedy is protective of human health and the environment.

For North Landfill OU02, Far-Mar-Co OU03, and Well #3 OU18 - once fully implemented, the remedy will be protective of human health and the environment.

For Far-Mar-Co OU06 - the remedy is protective of human health and the environment in the short-term.

For Colorado Avenue OUs 01 and 09, South Landfill OU05, Second Street OUs 12 and 20, and Area-Wide Ground Water Action OU19 - more data are needed to make a protectiveness determination.

For NAD OU08, 14, 15, and 16 (remaining NAD OUs) - the Five-Year Review has not been completed; therefore, no protectiveness determination has been made.

Other Comments:

There are several parties involved with the cleanup of these 20 OUs. Some RAs are fund-lead and require a state match. Other response actions are being conducted by the USACE and still others are fully funded by the private responsible parties. Cooperation and coordination among all the entities is crucial for the successful cleanup of the source areas and the restoration of the aquifer.

Five-Year Review Report

The purpose of the Five-Year Review is to determine whether the remedy at the site is protective of human health and the environment. The method, findings, and conclusions of reviews are documented in Five-Year Review reports. In addition, Five-Year Review reports identify issues found during the review, if any, and recommendations to address them.

I. Introduction

The EPA is preparing this Five-Year Review pursuant to Section 121 of the Comprehensive Environmental Response Compensation and Liability Act as amended (CERCLA), 42 U.S.C. §9621 and the National Contingency Plan (NCP). CERCLA § 121 states:

If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgement of the President that action is appropriate at such site in accordance with Section 104 or 106, the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.

The EPA interpreted this requirement further in the NCP; 40 CFR §300.430(F)(4)(ii) states:

If a remedial action is selected that results in hazardous substances,

pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.

The EPA has been investigating sources of ground water contamination in the Hastings area since 1984. Due to the high levels of volatile organic compounds (VOCs) found in three municipal wells, the EPA designated the contaminated area as the Hastings Ground Water Contamination Site (HGWCS). The HGWCS covers the central industrial area of the city of Hastings, Adams County, Nebraska, and adjacent areas outside of the city limits. The HGWCS was placed on the National Priorities List in 1986. The National Priorities List is a nationwide list of hazardous waste sites that are eligible for investigation and remediation under the Superfund Program.

The HGWCS was divided into seven subsites for investigative and remediation purposes on the basis of geographic and constituent source area characteristics. The subsites include the Former NAD, FAR-MAR-CO, North Landfill, South Landfill, Second Street, Colorado Avenue, and Well #3. The Area-Wide Ground Water Action is a separate operable unit (OU19) and addresses contamination present at, and migrating from, all the subsites but the NAD

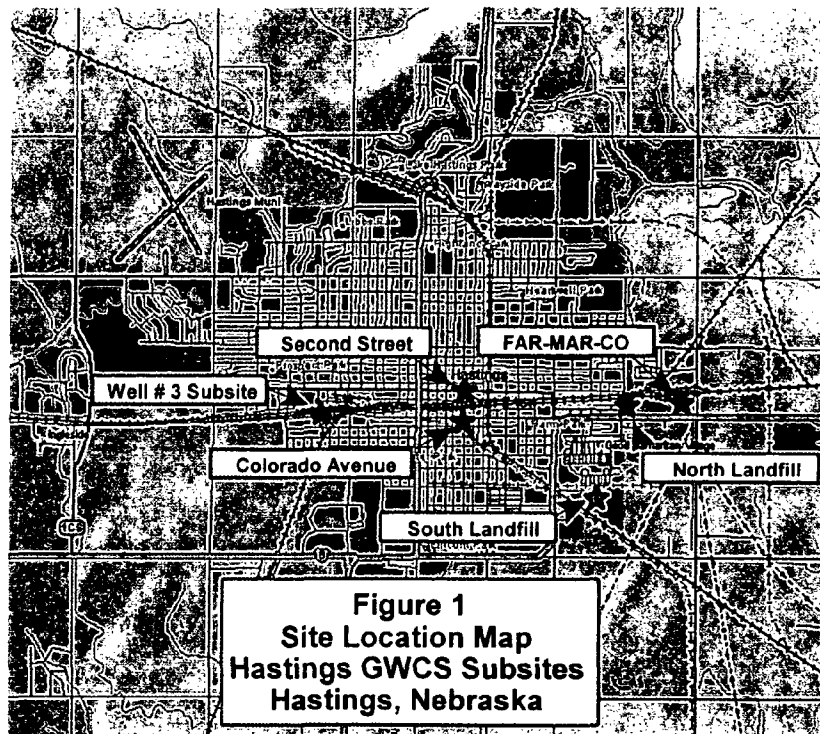
that is not being captured by subsite actions. The Area-Wide Ground Water Action does not include contamination emanating from the NAD.

The EPA, in cooperation with the Nebraska Department of Environmental Quality (NDEQ), has conducted a Five-Year Review of the Superfund RA implemented at the six city subsites. The USACE, with input from EPA and NDEQ, conducted the Five-Year Review for OU04 of the NAD Subsite.

The Five-Year Review Report was completed pursuant to Section 121 (c) of CERCLA, Section 300.430 (f) (4) (ii) of the NCP and pursuant to EPA/Office of Solid Waste and Emergency Response (OSWER), Comprehensive Five-Year Review Guidance (OSWER Directive 9355.7-03B-P, June 2001).

This is the second Five-Year Review for the HGWCS. The initial Five-Year Review was triggered by the initiation of the actual on-site construction at the Well #3 Subsite, OU 07 (October 1992). The first Five-Year Review was issued in May 1997.

This current Five-Year Review covers the period from May 1997 to May 2002. Review activities were conducted between November 2001 and June 2002. As the HGWCS is made up of 20 OUs, several informational sources contributed to this report. The EPA has collected and condensed this information to fit into the format required for Five-Year



Review Reports.

Information for the Well #3 Subsite was provided by EPA (analytical data), the city of Hastings, and HydroTrace, the contractor for Dutton-Lainson (a responsible party at the subsite). At the Colorado Avenue Subsite, the analytical information was provided by Dravo Corporation (a responsible party at the subsite) and EPA's contractors. At the Second Street Subsite, analytical data was provided by EPA's contractor. At the North Landfill Subsite, the analytical information was provided by the city of Hastings and HydroTrace, the contractor for the North Landfill responsible parties. At the FAR-MAR-CO Subsite, the source control analytical data was provided by Burns & McDonnell, the contractor for Farmland Industries, Inc., (a responsible party at the subsite). The ground water analytical data was provided by HydroTrace, the contractor for Morrison Enterprises (a responsible party

at the subsite). At the South Landfill Subsite, the analytical information was provided by EPA's contractor and the city of Hastings and its contractor, ARCADIS Geraghty & Miller, Inc. At the former NAD, the information was provided by the USACE and is included as Appendix 1. The information for the Area-Wide portion of the site was provided by the state of Nebraska, EPA's contractor, and the city of Hastings.

This Five-Year Review Report documents the status of construction activities. The NDEQ and the EPA inspections determined that the contractors constructed the remedies in accordance with the RD plans and specifications. The inspections also clarified the status of additional construction work. The subsite updates below identify the activities which were initiated since the 1997 review and any additional activities necessary to achieve the RODs performance standards, protectiveness, and site completion.

The USACE conducted the Five-Year Review of the former NAD and a copy of the USACE Five-Year Review Report is attached as Appendix 1.

EPA's Second Five-Year Review will become part of the site file and is included in the site Administrative Record located in the Hastings Public Library, Hastings, Nebraska, and in the EPA's Region VII site file.

II. Site Chronology

Table 1 summarizes the chronology of subsite activities.

III. Background

A. Physical Characteristics

The city of Hastings is located in the south-central part of Nebraska and the northeastern part of Adams County. Hastings is the largest city in the county and the county seat. The city is in the Central Loess Plains section of the Great Plains. Most of the area is nearly level to low rolling loess plains that are dissected by small drainageways. Nearly all soils are deep and are formed in calcerous loess, eolian sands, or mixed silty and sandy alluvium.

The city of Hastings, Nebraska, lies above the surface water divide between tributaries to the Little Blue River and tributaries to the West Fork Big Blue River. Several naturally occurring wetlands lie within 10 miles of Hastings. The climate is continental and marked by wide seasonal fluctuations in temperature and precipitation. Temperature below 0°F in winter and above 100°F in summer are common. The mean annual temperature is 51°F, and the average annual rainfall is 26.6 inches. The average growing season is 160 days.

B. Land and Resource Use

The city of Hastings, Nebraska, is the center of agricultural, industrial, and commercial activities for Adams County. The population of approximately 23,000 has been stable in recent decades. Farming is important in the area and is based mostly on growing cash grain crops and raising livestock. More than 75% of the acreage in the county is cultivated, and 16% is in rangeland. Less than 1% of the county is in woodland and windbreaks. The lack of seasonal rainfall makes irrigation from deep wells important in

**Table 1
Chronology of Site Events**

Subsite Operable Unit/Event	Date
Hastings Ground Water Contamination Site and Area Wide OU19	
Initial Discovery of Problem	July 1, 1984
Pre-NPL Responses	October 15, 1984
Special Notice Issued	September 23, 1985
NPL Listing	June 10, 1986
Area-Wide FS	April 2000
Area-Wide Interim Action ROD	June 24, 2001
Special Notice to PRPs	December 28, 2001
Five-Year Review Site Visit	March 20, 2002
FAR-MAR-CO - OU03 and OU11	
RI/FS Completion	September 30, 1988
ROD Signature - Far-Mar-Co Soils	September 30, 1988
Removal Action OU11	October 26, 1989, to December 23, 1989
ESD for Far-Mar-Co (SVE Plus Phase)	August 22, 1995
Consent Decree, Farmland Ind.	May 7, 1997
SVE Construction, Inspection	November 19, 1997
RA Report	December 19, 1997
O&M Start	November 19, 1997
FAR-MAR-CO - OU06	
EE/CA	October 20, 1995
Action Memorandum	December 6, 1995
PRP Removal	September 16, 1996,
Initiation of Removal Action	July 17, 1997, Operational
Colorado Avenue - OU09	
ROD Signature	September 28, 1988
PRP RD, Phase 1	January 17, 1995
PRP RA	September 27, 1995, Ongoing
Colorado Avenue - OU01	
ROD Signature	September 30, 1991
ROD Amendment	May 25, 1998
PRP RD	March 12, 1999
PRP RA	March 12, 1999
Well #3 Soils - OU07	
ROD	September 26, 1989
Fund-Lead RD	December 13, 1991
Fund-Lead RA	December 10, 1991, to August 17, 1993
Final Inspection	April 21, 1993
RA Report	August 17, 1993

Table 1
Chronology of Site Events

Subsite Operable Unit/Event	Date
Certification of Completion	November 1994
First Five-Year Review	May 27, 1997
Well #3 Plume 2 Soils - OU17	
EE/CA	May 11, 1995
Action Memorandum	July 20, 1995
PRP Removal	March 25, 1996, to April 15, 1997
SVE Plus Phase	April 16, 1997, to June 10, 1998
Certification of Completion	December 8, 1999
Well #3 Ground water - OU13 and OU18	
ROD	June 30, 1993
ESD, OU13	December 14, 1994
ESD Phase II, OU13	July 23, 1996
ROD Amendment, Select MCLs for CCl ₄	November 19, 1999
RD, Fund-Lead, OU13	September 29, 1994, to July 25, 1996
RA, Fund-Lead, OU13	September 24, 1994, to July 30, 1996
Interim RA Report, Fund-Lead, OU13	December 11, 1998
Final ROD for Well #3 Subsite, All OUs	May 17, 2001
Special Notice to PRPs, OU18	September 28, 2001
North Landfill - OU02 and OU10	
ROD	September 30, 1991
RD Complete, OU10	January 12, 1996
Consent Decree, Pilot Allocation	August 14, 1998
RA Start, OU10	February 6, 1998, to June 22, 1998
Inspection of Landfill Cap, OU10	September 1, 1999
RA Report, OU10	November 23, 1999
Vadose Zone Sampling	Began December 1999, For 8 Quarters
Second Street - OU12	
EE/CA	September 20, 1995
Fund-Lead Removal	September 18, 1996
Action Memorandum	June 5, 1997
Source Area System Startup	January 1997
OU12 EE/CA Addendum	June 1999
Downgradient GW System Startup	May 2001
Second Fund-Lead Removal OU20	September 1999
FS Completion	Summer 2002
South Landfill - OU05	
ROD	September 2000
Pre-Design Work, Landfill Cap	Ongoing

the area. About 25% of the acreage in the county is irrigated.

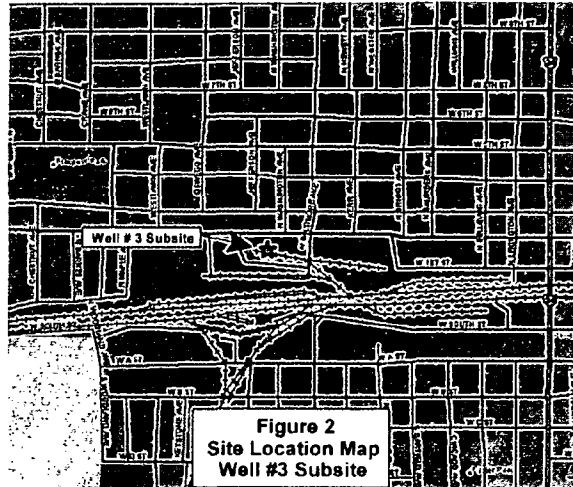
Four of the six city subsites are located within the Hastings city limits. The FAR-MAR-CO Subsite and the South Landfill Subsite are located outside of, but adjacent to the east and southeast city boundary. The NAD is located approximately 1 mile east of the city. Residential communities are located adjacent to the six subsites. The Colorado Avenue, Well #3, and Second Street Subsides are located in the central-industrialized area of Hastings.

C. History of Contamination

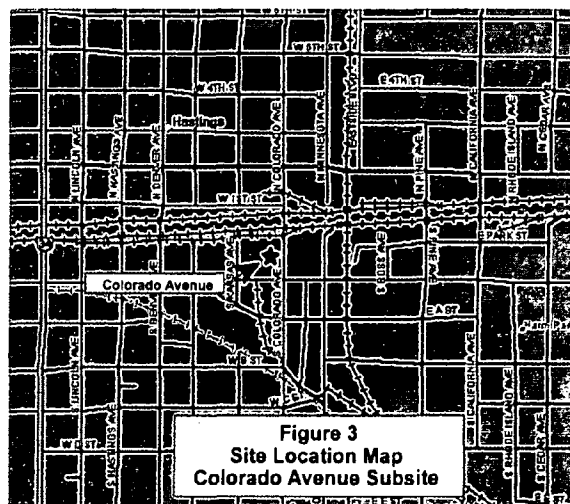
The HGWCS was discovered in 1983 through investigations by the Nebraska Department of Health and the Nebraska Department of Environmental Control (subsequently known as the NDEQ). EPA began investigations of the ground water contamination in 1984.

Well #3 Subsite - The Well #3 Subsite is located in the central industrial area of Hastings between B Street and Second Street in the north-south direction and between Maple Avenue and Denver Avenue in the east-west direction. The subsite is named for the former public water supply well (M-3) which was decommissioned due to the presence of CCl_4 in the well water.

The source area was located in an area where a grain storage facility operated from 1959 to 1975. A second plume (Plume 2) was identified in 1993 and was found to contain TCE, TCA, 1,1-dichloroethylene (1,1-DCE) and PCE. One source for Plume 2 was found at the Dutton-Lainson Property located at 1601 West 2nd Street. Figure 2 is a location map of the Well #3 Subsite.



Colorado Avenue Subsite - The source area is located south of the downtown Hastings business district between the Burlington Northern Railroad (BNRR) right-of-way and South Street in the north-south direction and between Kansas Avenue and 6th Avenue in the east-west direction. The EPA's soil gas, soil, and ground water investigations indicated the presence of chlorinated VOCs in the soil and ground water. Ground water impacts were discovered in 1983 when the city of Hastings attempted to put municipal well M-18, located about 1/2 mile east of the



source area, back into service. NDEQ analyzed the samples from M-18 in 1983 and 1984 and found elevated concentrations of chlorinated organics, including TCA, TCE, and PCE. Figure 3 is a location map of the Colorado Avenue Subsite.

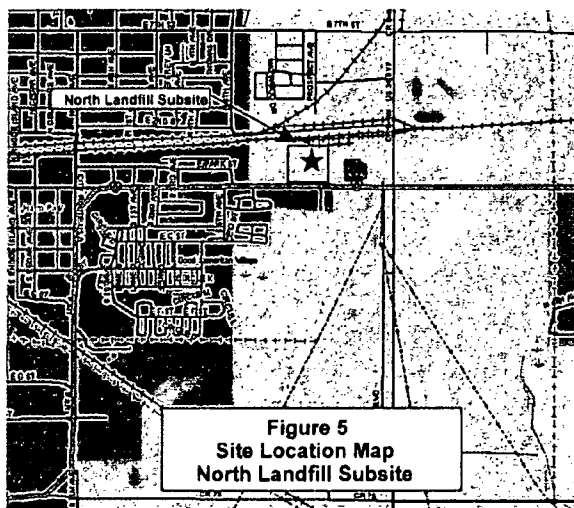
Second Street Subsite - The source area is located in the central business district of Hastings where a manufactured gas plant was in operation from 1894 to 1931. The source area is bounded by the BNRR to the south, the former Union Pacific right-of-way to the east, Second Street to the north, and Minnesota Ave to the west. The city is the current owner of the property. The EPA's investigations identified benzene, toluene, ethylbenzene, xylene and polynuclear-aromatic hydrocarbons (PAH) in subsite soils and in the ground water beneath and to the east of the subsite. Figure 4 is a location map of the Second Street Subsite.

North Landfill Subsite - The source area is bounded by the BNRR right-of-way to the north and U. S. Highway 6 to the south. The landfill is situated on land that was formerly used as a clay source for local brick makers. From August 1961 to 1964 the city leased the land and operated a landfill at the

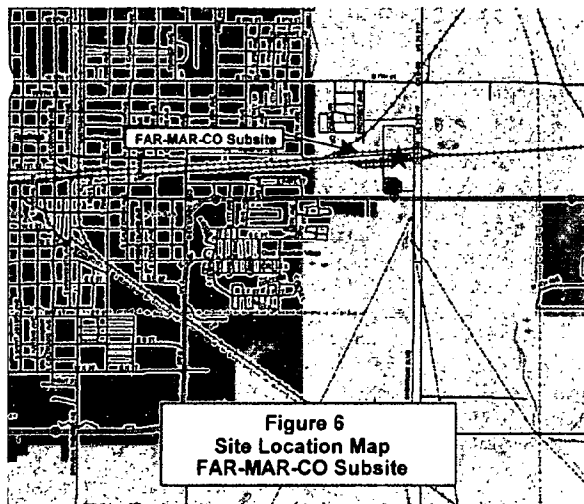


subsite. The subsite is relatively flat and occupies 13.4 acres. Investigations at the North Landfill Subsite began in 1984. Soil-gas surveys were conducted by EPA in 1985 and 1986 which revealed VOCs in the vadose zone. City municipal well M-12, located near and upgradient to the North Landfill, was taken out of service in 1983 when TCE was detected in the well. There is a ground water plume migrating from the source area down gradient from the subsite. Figure 5 is a map of the North Landfill Subsite.

FAR-MAR-CO Subsite - The subsite is located east of the Hastings city limits in an



industrial enterprise zone served by the BNRR. In general, the area has been used for the storage and handling of agricultural products for over 30 years. Investigations performed at the subsite found VOCs related to grain fumigants in the soils and ground water. The subsite consists of industrial properties on about 70 acres having several owners. A liquid grain fumigant containing CCl_4 and EDB used during grain elevator operations was found in the soils and ground water. In 1983, VOCs were first detected in the Community

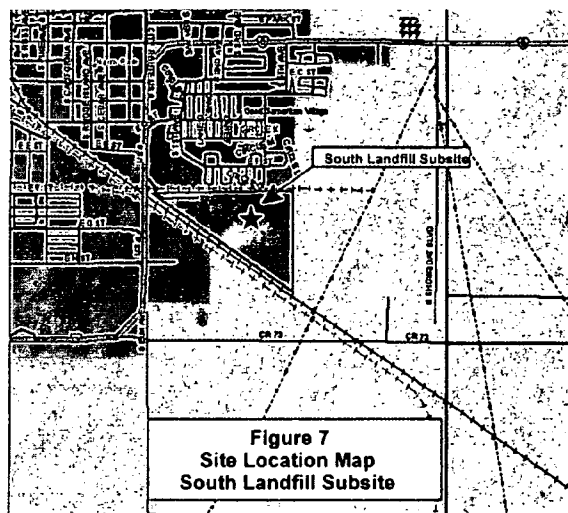


Municipal Services, Inc. (CMS) water distribution system east of the site. Ground water data collected by EPA indicate that a ground water plume containing CCl_4 and EDB is migrating from the source area in the direction of a CMS well which had been providing drinking water to the Hastings East Industrial Park (HEIP) and the Hastings Community College (prior to a hook-up to the city water supply system). Soils surrounding a group of buildings converted from grain storage to manufacturing use were contaminated with TCA. The owner of the manufacturing facility cleaned up the soils under an Administrative Order on Consent.

South Landfill Subsite - The subsite is located near the southeast border of Hastings. It is bounded by the abandoned Union Pacific Railroad right-of-way tracks on the south, the Good Samaritan Village retirement complex on the north, and U. S. Highway 6 on the west. The South Landfill was originally a clay pit. The landfill was constructed with two main disposal cells with a drainage ditch between the cells. The landfill was operated by the city from the mid-1960s to the early 1980s. Several VOCs are present in the soils and ground

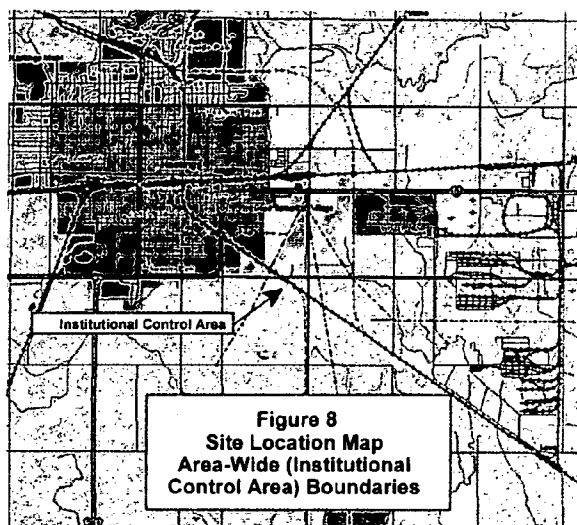
water at the subsite. Figure 7 is a map of the South Landfill Subsite.

Area-Wide Ground Water Action - The



HGWCS ground water contamination is known to extend west to east from the Well #3 Subsite, through the central business district, to the eastern boundaries of the former NAD. The Area-Wide portion of the site refers to the overall ground water contamination related to and interconnected between the six city subsites. The Area-Wide actions will address ground water contamination that is not being addressed by the city subsite actions.

The interim RA selected by the June 24, 2001, ROD includes a comprehensive survey of all existing ground water wells (domestic, irrigation, industrial, and monitoring) and collection of data such as well logs, well location, well depth, well use, and analytical results. Additional monitoring wells will be installed, as necessary and monitoring conducted to determine if VOC contamination is present above the MCLs established under the Safe Drinking Water Act. In such cases where MCLs are exceeded in a drinking water well, an



alternative water supply will be provided. The city has begun implementation of this activity by enacting an ordinance establishing an institutional control area (ICA). Under provisions of the ordinance, the city has sampled numerous existing private wells and has established a well registration process to assure new wells are not installed in areas of contamination. Figure 8 is a map of the ICA of the HGWCS.

D. Initial Response

The HGWCS was discovered in 1983 when several municipal supply wells were discovered to be contaminated with VOCs. Subsite response actions since the 1997 Five-Year Review will be discussed under the specific subsite.

E. Basis for Taking Action

Table 2 presents the COCs and the maximum concentrations found at each of the city subsites. These contaminants are also present in the soils at the specific subsites.

A baseline risk assessment was prepared by the Nebraska Health and Human Services System for the HGWCS, dated November 1997. This assessment evaluates the potential area-wide risk associated with hypothetical human exposure to residual ground water concentrations after the interim remedial/removal actions have been completed at each of the subsites. The risk determinations are summarized in Table 3.

IV. Remedial Actions

A. Well #3 Subsite

Remedy Selection - The EPA has addressed two plumes at this subsite. Plume 1 of the subsite was discovered in 1983 when the NDOH detected CCl_4 , an ingredient of a grain fumigant, in M-3. In 1989, EPA issued a ROD for the cleanup of the soils contaminated with CCl_4 (OU07). SVE was selected and used to remove this contamination. EPA began full-scale remediation in July 1992. In July 1993, EPA and NDEQ determined that remediation of the soils was complete.

In the fall of 1993, further investigation led to the discovery of an additional plume which has been named Plume 2, characterized primarily by TCE and PCE. Soil gas survey results concluded that Plume 2 was emanating from the north side of the BNRR tracks on the property of Dutton-Lainson Company.

In 1995, a ground water treatment system to treat CCl_4 using air stripping was installed for Plume 1 (OU13). The system utilizes reinjection wells to reuse the water after it has been treated. A second extraction system was installed in October 1996. The extracted ground water is being released

Table 2
COCs and Maximum Concentrations

COCs	South Landfill µg/l	Well #3 µg/l	FAR-MAR- CO µg/l	North Landfill µg/l	Second Street µg/l	Colorado Ave µg/l
Benzene	-	-	-	-	25,000	-
CCl ₄	-	1,400	2,800	8	-	1
Chloroform	-	120	19	1,900	52	3.6
1,2-DCA	26	110	220	27	1,700	-
1,1-DCA	22	2	220	36	-	360
1,1-DCE	29	150	13	60	-	1,400
Ethyl Benzene	-	-	-	-	19,000	-
Methylene Chloride	-	23	90	150	-	2,200
Styrene	-	-	-	-	12,000	-
PCE	12	200	19	48	530	1,300
TCE	300	990	1,200	2,400	16,000	55,000
Toluene	-	-	-	-	28,000	-
VC	44	-	-	87	-	-
EDB	-	<1	220	8.8	-	-
1,1,1-TCA	11	200	200	99	2,000	2,100
cis 1,2-DCE	340	-	-	650	-	310
trans 1,2-DCE	-	-	41	2,000	-	81
Naphthalene	-	-	-	-	7,900	-
Xylenes	-	-	-	-	11,000	-

into the storm sewer. EPA installed an irrigation system at a city park in 1997 for beneficial reuse of this extracted water, and in 1998 began utilizing the extracted ground water as irrigation water at Lincoln Park. In November 1999, EPA amended the ROD by selecting the MCLs as the performance goal for Plume 1. The EPA is in the process of verifying the attainment of these goals. In September 2000, EPA initiated restoring the subsite with the abandonment of three monitoring wells that were free of contamination based upon quarterly ground water monitoring. The EPA continues to monitor the ground water on a quarterly basis and will do so until CCl₄ has been found to be

below MCLs for eight consecutive quarters. In 2002, the EPA abandoned the reinjection wells and three monitoring wells at the subsite and the extraction and treatment equipment at CW-05 (Phase 1).

In March 1996, Dutton-Lainson Company, the responsible party identified for the Plume 2 (OU17) contamination, performed a removal action to address soil contamination. Consistent with EPA's Action Memorandum, SVE was the technology implemented.

In April 1997, the EPA determined that the SVE system had attained the removal action

<p align="center">Table 3 Summary of Human Health Risk Assessment</p>				
Health Risk	<i>Receptor #1</i>	<i>Receptor #2</i>	<i>Receptor #3</i>	<i>Receptor #4</i>
	<i>Well No. 3 Subsite</i>	<i>Colorado Avenue and Second Street Subsites</i>	<i>North Landfill and FAR-MAR-CO Subsites</i>	<i>South Landfill Subsite</i>
Non-Carcinogenic Residential Risk (Hazard Index), Child	14.2	56.3	31.1	3.8
Non-Carcinogenic Residential Risk (Hazard Index), Adult	5.7	22.5	12.9	1.6
Carcinogenic Residential Risk, Child	4.68×10^{-4}	4.31×10^{-4}	7.70×10^{-4}	9.08×10^{-5}
Carcinogenic Residential Risk, Adult	9.22×10^{-4}	8.50×10^{-4}	1.22×10^{-3}	1.74×10^{-4}

goals for the remediation of the soils. Dutton-Lainson requested to extend the operation of the SVE system to determine if the extended operational period would reduce the contamination present in the aquifer. Quarterly ground water monitoring was conducted during this period. The operation of the SVE system was terminated in June 1998. By September 1999, the EPA and NDEQ determined that no additional response action was needed for OU17. Dutton-Lainson proceeded with the abandonment of the extraction and monitoring wells. The EPA determined that the removal action was complete in December 1999. Dutton-Lainson continues to conduct quarterly ground water sampling. The analytical results show that the level of the Plume 2 contaminants remains below the action level established in EPA's 1993 ROD.

The EPA issued its first interim action ROD for OU07 (source control) in September 1989. The remedy selected was SVE which was implemented and completed in 1993.

The EPA released its second interim action ROD (ground water) for OU13 and OU18 in 1993. The EPA selected ground water extraction and treatment as the remedy. The EPA implemented the OU13 remedy in 1995. In 1996, EPA issued an Explanation of Significant Difference for OU13 which allowed the reuse of the extracted ground water as irrigation water at Lincoln Park. In 1999, EPA amended the ROD for OU13 to select the MCLs as the performance goal. In March 2000, the EPA determined that the MCLs for OU13 were attained. The EPA is currently verifying this attainment.

The EPA issued an Action Memorandum in 1995 for OU17, which selected SVE as the response action. Dutton-Lainson completed the removal action in 1997 and continued the operation of the SVE system to address the shallow ground water contamination. The EPA determined that the goals of the extended operation of the SVE system were attained in 1998. Although the extraction and treatment system for OU18 was not installed, the cleanup goals in the 1993

Interim Action ROD were attained by the extended operation of the SVE system. In 2001, the EPA released its final ROD for OU07, 13, 17, and 18. For OU07, 13, and 17, no further actions were determined to be necessary. For OU18, the EPA selected the continued operation of the extraction system installed at M-3 until MCLs for TCE, TCA, 1,1-DCE, and PCE would be achieved and verified. The EPA is currently negotiating with Dutton-Lainson to complete this work.

Figure 9 is a picture of the extraction well at the Well #3 Subsite taken during the Five-Year Review site visit.

Remedy Implementation - The remedy for OU07 was implemented and completed in 1993. The remedy for OU13 began in 1995. The remedy for OU17 was implemented as a removal action and was completed in June 1997 with the extended period of operation completed in 1998. The final remedy for OU18 will be implemented using the extraction and treatment system that was installed for OU13 instead of installing a new extraction and treatment system. It will operate until the MCLs for Plume 2 have been attained and verified.

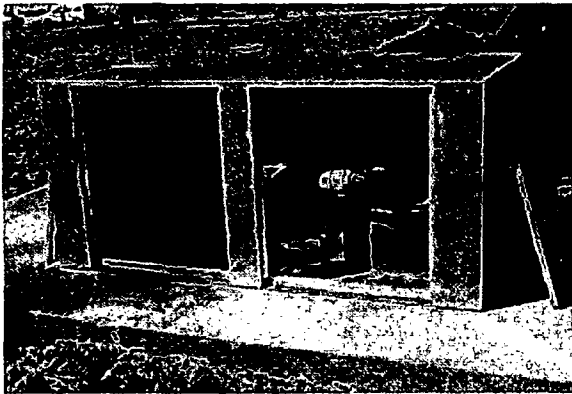


Figure 9
Ground Water Extraction Well at Well #3 Subsite

System Operations/O&M - The operation of the SVE system for OU07 was completed under the first Five-Year Review and will not be discussed in this review. The first Five-Year Review determined that the contamination was removed from the soils which allow for unlimited use and unrestricted access.

There have been two ground water extraction systems in operation for OU13. The Phase 1 system was installed in monitoring well CW-05 and extracted ground water at 80 gallons per minute. The extracted water was treated with air to release the contaminants prior to reinjection into the aquifer. This system removed approximately 160,000,000 gallons of contaminated ground water from the aquifer and treated approximately 3.7 pounds of CCl_4 and 23 pounds of other chlorinated solvents in its operation through December 4, 2001. The Phase 2 system was installed in former municipal supply well M-3 and extracts ground water at a rate of approximately 200 gallons per minute. The extracted ground water is released into a storm sewer and, during the growing months, the water is used as park irrigation water at Lincoln Park. As of December 4, 2001, the system at the former municipal supply well M-3 extracted approximately 520,000,000 gallons of contaminated ground water estimated to contain approximately 13 pounds of CCl_4 . The electrical cost to both extraction systems is approximately \$12,000 per year. The city of Hastings performs the operation, maintenance, and monitoring activities under a Cooperative Agreement with EPA. Through December 31, 2001, the city of Hastings spent a total of \$440,532.62 under this grant. These costs included the costs for the installation of the underground irrigation system at Lincoln Park, the O&M

costs associated with both the extraction system and the collection of the quarterly ground water monitoring samples. The costs are summarized in Table 4a below.

Table 4a Annual System O&M Costs - Well #3		
Dates		Total Cost Rounded to Nearest \$1,000
From	To	
1-97	1-98	120,000
1-98	1-99	337,000
1-99	1-00	130,000
1-00	1-01	137,000
1-01	1-02	204,000

The ground water extraction and treatment system will continue to operate at M-3 until the Plume 2 contaminants (OU18) reach MCLs. The EPA estimated that this would be achieved within 15 years.

These cost totals include EPA's direct and indirect costs (indirect costs are overhead and administrative expenses), Cooperative Agreement costs, state of Nebraska costs, and analytical costs paid by EPA for all four OUs (07, 13, 17, and 18). Dutton-Lainson reportedly spent \$34,000 in analytical costs for conducting ground water monitoring. Other Dutton-Lainson costs were not provided to EPA.

Progress Since the Last Five-Year Review - The EPA released its final ROD for all the Well #3 operable units in 2001. The EPA completed the work at OU17 and is close to completing the work at OU13 with some site restoration activities completed in the summer of 2002. The EPA is recently negotiated with Dutton-Lainson to take over

the operation of the system at M-3 for OU18. Quarterly ground water monitoring will continue until the MCLs have been attained and verified for both Plume 1 and Plume 2. The RA goals for OU7 and OU17 have been attained and verified. The RA goals for OU13 have been attained and are in the verification process. The RA goals for OU18 are projected to take 15 years for attainment. Quarterly ground water monitoring will be continued until the performance goals are attained and verified. This review determined that the remedies selected for the Well #3 Subsite (OUs 07, 13, 17, and 18) are protective and that no follow-up issues have been identified.

B. Colorado Avenue Subsite

Remedy Selection - The Colorado Avenue Subsite is located just south of the BNRR tracks along Colorado Avenue. The COCs include TCE, DCE, PCE, and TCA, which have been found in both the soil and ground water along and beneath a storm sewer at the subsite.

In 1988, the EPA issued an Interim Action ROD (OU09) in which it selected SVE as the technology to clean up approximately 800,000 cubic yards of contaminated soil.

EPA completed a study into the nature and extent of ground water contamination at this subsite in 1991 for OU01. Also in 1991, an Interim Action ROD was signed selecting extraction and treatment as the ground water remedy.

In 1998, the EPA amended the OU1 ROD by expanding the range of acceptable alternatives to include in-situ water treatment technologies (i.e., air sparging and in-well stripping).

Remedy Implementation - Construction of the SVE system for Phase 1 was initiated in 1995. The system began operating in 1996. Construction of the shallow SVE wells (Phase 2) has not begun but design of the Phase 2 system was approved by EPA in 2001. The EPA estimates the SVE remediation will be completed in 2008.

In January 1996, Dravo, the PRP performing the work, proposed a plan to install a small-scale air sparging pilot test. EPA agreed to allow this pilot to go forward before requiring implementation of the pump and treat system. Figure 10 is a photograph of the building housing the in-well aeration water treatment system installed at the Colorado Avenue Subsite taken during the Five-Year Review site visit.

Dravo is performing the RAs under Unilateral Administrative Orders issued by EPA. For OU9, the Phase 1 deep and intermediate SVE well system, has been implemented and cycles through periods of operation and resting. The Phase 2 shallow well SVE system will be constructed during 2002.

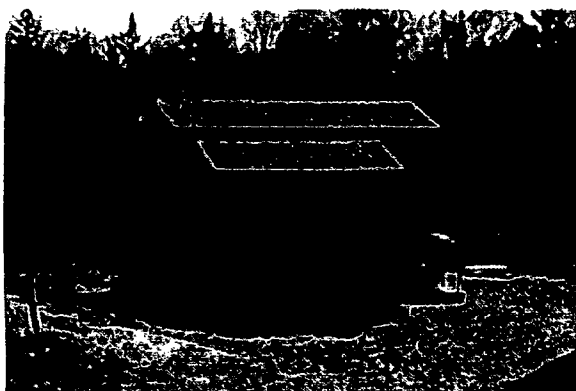


Figure 10
The In-Well Aeration Water Treatment System
at the Colorado Avenue Subsite

The remedy for the ground water (OU1) is also being implemented in phases. Phase 1, consisting of three air sparging wells, was installed at Minnesota Avenue. These wells utilize the SVE system to capture VOCs released from the ground water. To date, this system has not operated.

The second phase of the interim action involved installation of three *in situ* aeration wells located at Pine Street and north of East Park Street. The treatment wells have been in operation since December 1999. Phase 1 and Phase 2 treatment systems were designed to treat the most contaminated areas of the ground water contaminant plume.

The Phase 3 design has been approved and will be installed down gradient at the west property boundary for the North Landfill subsite. A final Phase 4 may also be needed to address ground water contamination that has migrated beyond the area of the proposed Phase 3 treatment system.

The performance goal for the interim action remedy for the ground water is the containment of the 10^{-4} risk range for TCE which is the 290 ug/l concentration level. The EPA has presented ground water monitoring results to Dravo which demonstrate that the capture of the 290 ug/l TCE plume is not occurring. This indicates that the remedy is not yet protective.

System Operation/O&M - The Phase 1 SVE system for source control has been installed but operates on a sporadic basis. The ground water systems have been installed for Phase 1 and Phase 2. The installation of the Phase 3 system will occur this summer.

Total expenditure by EPA and Dravo is \$4,226,000. The EPA's costs include direct,

indirect, state of Nebraska's oversight costs, and contractor support costs. The costs are summarized in Table 4b.

Table 4b Annual System O&M Costs Colorado Ave.			
Dates		Total Cost Rounded to Nearest \$1,000	
From	To	EPA's	DRAVO's
1-97	1-98	\$222,000	\$302,000
1-98	1-99	\$224,000	\$240,000
1-99	1-00	\$541,000	\$1,356,000
1-00	1-01	\$276,000	\$478,000
1-01	1-02	\$344,000	\$243,000

Progress Since the Last Five-Year Review -
 In 1999, the EPA modified the interim action ROD for OU01. The ROD Amendment permitted implementation of the air sparging and in-well stripping technologies. Three *in-situ* air-stripping wells were installed and became operational in 1999. Construction planning activities are being concluded for Phase 3 of the ground water action. Ground water monitoring conducted by the North Landfill and FAR-MAR-CO Subsite parties indicate that the contamination emanating from Colorado Avenue continues to migrate. Additional response actions are needed to control and contain this contaminant plume. The EPA anticipates that the remedies, when fully implemented, will be protective. The issues remaining are the implementation of the full-scale system addressing the contamination in the soils and the installation and the operation of the ground water systems to address the ground water contamination.

C. Second Street Subsite

Remedy Selection - The Second Street Subsite is located on the southeast corner of Second Street and Minnesota Avenue, bounded on the south by the former BNRR tracks and on the east by the Union Pacific Railroad right-of-way. A coal gas plant operated on this property in the 1800s and early 1900s. Releases to the environment from this operation resulted in contamination of soils and ground water.

EPA completed a remedial investigation in 1994 and an Engineering Evaluation/Cost Analysis in 1995. In 1995, EPA issued a Removal Action Memorandum. The EPA selected SVE which may be followed by bioventing to remove contamination from the vadose zone and ground water extraction and treatment to remove contamination from ground water. The city of Hastings, the current owner of the subsite (and the responsible party), entered into an Administrative Order on Consent with EPA in 1996 in which it agreed to, among other things, provide electricity, gas, water, and sewer line hookups; assist EPA in obtaining necessary permits; and conduct O&M of the removal action systems. The EPA found that oil was entering the ground water treatment system and installed an oil/water separator. The system has been operating continuously since July 1998. The treatment system processes approximately seven million gallons of water per year.

In 1999, a second removal action (OU20) was initiated to address down gradient ground water contamination emanating from the source area. This second removal action consisting of an in-well stripping and treatment system was started up in 2001 and continues to operate. Figure 11 is a picture of the ground water treatment and

SVE systems at the Second Street Subsite taken during the Five-Year Review site visit.

To date, all response actions have been conducted by EPA using its removal authority with these actions focusing on source removal. The first removal action began in 1995 using SVE and ground water extraction and treatment. The second removal action began in 2001 and uses an in-well aeration system for the down gradient contaminant removal. During 2001 and 2002, EPA has been in the process of preparing an FS to analyze RA alternatives for the ground water contaminant plume. A ROD will be prepared to define the subsite remedies to address the ground water contamination emanating from the subsite.

Remedy Implementation - The first removal action, consisting of an SVE and ground water extraction and treatment system, has been in operation since 1997. In 1998, EPA installed an oil/water separator in the ground water treatment system. The second removal action, consisting of two in-well aeration wells, was initiated in 2001. The EPA plans to complete a ROD for the ground water (OU20) in 2002. Subsequent

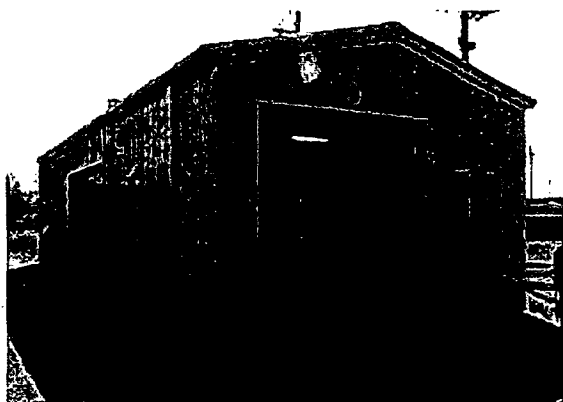


Figure 11
Ground Water Treatment and SVE System
at the Second Street Subsite

to completing the ROD, the EPA anticipates entering negotiations with NDEQ for a Superfund cost-sharing contract to allow implementation of a RA to proceed.

System Operation/O&M - The EPA has expended \$4,123,000 on work conducted at this subsite. These costs include EPA's direct and indirect costs as well as costs for EPA's contractor and state of Nebraska's costs. In addition to providing in-kind services for the day-to-day operation of the treatment systems for the first removal action, the city is also providing support for the second removal action by leasing the building which houses EPA's water treatment system for the second removal action. Expenditures by the city of Hastings in the operation of these systems were not provided to EPA. Table 4c summarizes subsite costs.

Table 4c Annual System O&M Costs Second Street		
Dates		EPA's Total Cost Rounded to Nearest \$1,000
From	To	
1-97	1-98	424,000
1-98	1-99	956,000
1-99	1-00	585,000
1-00	1-0	1,186,000
1-01	1-02	972,000

Progress Since the Last Five-Year Review - The first removal action addressing the ground water (OU12) continues to operate and has removed seven million gallons of contaminated ground water per year from the aquifer during the past five years of

operation. More than 15,000 pounds of VOCs have been removed throughout the operation of the SVE system.

The second removal action (OU20) addresses the ground water contamination using in-well aeration. This system is removing more than one half pound of total volatiles per day. The EPA, in consultation with NDEQ, has been preparing the RI/FS for the ground water. The EPA plans to release the final ground water FS this year. The existing RAs are protective but are limited in scope. The EPA plans on releasing its FS for the ground water to select a remedy to address the contamination in the ground water.

D. North Landfill Subsite

Remedy Selection - The North Landfill Subsite is located north of Highway 6 just east of the city of Hastings. The city had operated a landfill at the subsite from 1962-1964. In 1991, EPA issued an Interim Action ROD which addressed both the source control (OU10) and the ground water (OU02). The RA for the source control consists of improving the landfill cap and restricting public access and future land use. The selected RA for the ground water is extraction and treatment. The responsible parties at the subsite agreed to perform the work; however, implementation of the RD for the ground water operable unit has been suspended by the EPA while the responsible parties participate in a ground water removal action at the FAR-MAR-CO Subsite located directly down gradient. The ground water contamination at the North Landfill Subsite has been comingled with the FAR-MAR-CO plume and is potentially being addressed by the FAR-MAR-CO response action.

The Interim Action ROD for both the source control and ground water OUs was released in 1991. In 1995, the responsible parties for both the North Landfill and FAR-MAR-CO Subsites requested that EPA delay the implementation of the ground water remedy in order to determine if the ground water remedy at the FAR-MAR-CO Subsite would capture and restore contaminated ground water at both subsites. The EPA and NDEQ agreed to this request and granted the responsible parties a five-year period to assess the effectiveness of the FAR-MAR-CO system. The responsible parties agreed to perform quarterly ground water sampling in order to evaluate the effectiveness and protectiveness of the remedy. Quarterly sampling is currently ongoing.

Remedy Implementation - The EPA approved the design for the landfill cap for the source control (OU10) in 1995. The city of Hastings constructed the cap in 1999 and has been performing vadose zone monitoring. By December 2001, eight quarters of soil-gas sampling were completed. Quarterly ground water monitoring has been conducted since June 1995.

The city of Hastings spent \$289,309.60 in the construction of the landfill cap. Another \$23,144.77 was spent in administrative costs and \$16,544.37 was spent in testing the soil during installation for a total cost of \$328,998.74. The city has spent \$215,207.68 monitoring the ground water and \$2,653.20 in monthly inspections and mowing of the cap.

Total expenditures by the city of Hastings for the source control (OU10) and for the ground water monitoring (OU02) at North

Landfill were \$546,859.62. The EPA had expenditures of \$135,000 during the past five-year time period. This included \$45,000 for costs that EPA shared with the responsible parties for the services of an allocator who assisted the group in reaching agreement regarding each party's share of costs. Total expenditures for the North Landfill Subsite were \$682,000. Table 4d summarizes subsite costs.

Table 4d Annual System O&M Costs North Landfill		
Dates		EPA's Total Cost Rounded to Nearest \$1,000
From	To	
1-97	1-98	96,000
1-98	1-99	20,000
1-99	1-00	8,000
1-00	1-01	6,000
1-01	1-02	5,000

System Operation/O&M - The city of Hastings performs the maintenance at the North Landfill. It monitors the condition of the landfill cap monthly and mows the subsite during the growing season. The Five-Year Review inspection included the inspection of the condition of the landfill cap.

Figure 12 shows a photo of the landfill cap taken during the Five-Year Review site visit.

Progress Since the Last Five-Year Review - The North Landfill source control remedy is functioning as designed. The North Landfill ground water design (OU10) has been suspended pending an evaluation of the report by the responsible parties on the

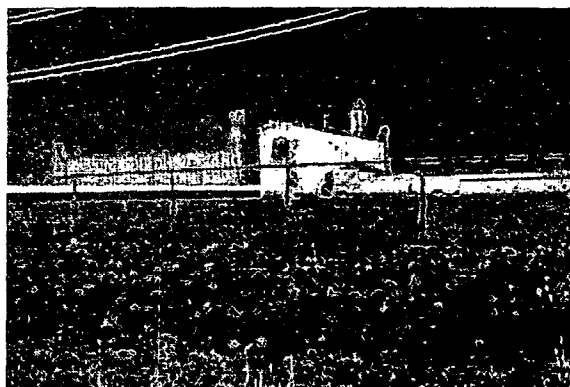


Figure 12
Completed Landfill Cap at the North Landfill Subsite. The FAR-MAR-CO Subsite grain elevators in the background.

performance of the system. This report is due to EPA in 2003. The analytical results from the quarterly ground water monitoring locations indicate that the levels of VOCs migrating from the landfill continue to decline. For the North Landfill Subsite, OU10 has achieved the performance goals and is determined to be protective. For OU02, the PRPs will present a report to EPA which will discuss the performance of Well D in controlling the North Landfill plume and whether the system will achieve Interim Action performance goals. The EPA will be able to evaluate the protectiveness of this remedy once this report is received

E. FAR-MAR-CO Subsite

Remedy Selection - The FAR-MAR-CO Subsite is located east of the North Landfill Subsite on the north side of Highway 6. The EPA has concluded that the contamination found in the soils and ground water is the result of numerous spills of grain fumigants, including one which occurred as a result of a grain dust explosion in 1959. A second source of contamination (TCA) was identified at the Hastings Irrigation Pipe Company portion of the subsite. A removal action addressed this source in 1992 and

the owner removed 43 cubic yards of soils contaminated with 1,1,1-TCA. No further action, other than ground water monitoring was required by EPA to address any TCA contamination after the removal action was completed as subsequent monitoring indicated that 1,1,1-TCA was not present in the ground water at levels of concern.

A ROD was signed in 1988 for the source control (OU03) which selected SVE and included ground water monitoring. In August 1995, an Explanation of Significant Differences to the ROD was issued to extend the SVE operation beyond the time when cleanup goals for the soils were met in order to extract contamination beneath the source to address the contamination in the ground water. A consent decree was entered on May 6, 1997, which required the Settling Defendants to perform SVE. The SVE system was fully installed in November 1997 and continues to operate continuously. The extended period of operation began in May 2000 and was completed in May 2002. Verification of attainment sampling will be conducted and the SVE system will be removed once sampling verifies the attainment of the performance standards. The EPA anticipates that site close-out activities will be completed in the fall of 2003.

An Action Memorandum was signed in December 1995 authorizing the performance of the ground water removal action (OU06). Installation of the ground water extraction system began in December 1996 and became operational in July 1997. This action includes related ground water monitoring. The EPA determined that a removal action was necessary to protect the only remaining CMS well from contamination. The CMS wells had provided drinking water to HEIP and the

Hastings Community College. All but one had been decommissioned due to contamination. After the system became operational, the city of Hastings extended a water main east of town to the HEIP and the Hastings Community College.

Remedy Implementation - The SVE system was installed for the source control (OU03) during the fall of 1997 with the startup in November 1997. The period of extended operation was initiated in May 2000. The ground water extraction and treatment system became operational in July 1997 for the ground water (OU06). A ground water ROD will be issued after the PRPs submit the 2003 ground water report. The PRPs continue to perform quarterly ground water monitoring.

System Operation/O&M - The SVE system operates 24 hours per day, seven days per week and is only off-line for maintenance and system monitoring. The EPA and Farmland Industries, Inc. determined the system achieved its extended performance goals in May 2002. Farmland will conduct verification sampling to determine that the clean up goals have been maintained and then will remove and abandon the SVE extraction wells and all monitoring probes.

The ground water extraction and treatment system for the ground water (OU06) was installed by Morrison Enterprises in the summer of 1997. The system was online in August 1997 and continues to operate as designed. The system extracts ground water at a rate of approximately 450 gallons per minute and has extracted one billion gallons of ground water since startup. The extracted ground water is used as non-contact cooling water at the Hastings Energy Center. As of December 2001, this action removed approximately 143 pounds of CCl_4 ,

1369 pounds of TCE, and 14 pounds of EDB from the aquifer.

No costs were provided by the Hastings Utilities, the city of Hastings, or Dutton-Lainson, who are part of this ground water removal action. Table 4e summarizes EPA's and Farmland's costs associated with FAR-MAR-CO source control actions. Table 4f summarizes costs associated with ground water treatment actions. Figure 13 is a photograph of the SVE system taken during the Five-Year Review site visit.

Table 4e Annual System O&M Costs FAR-MAR-CO Source Control		
Dates		EPA's and Farmland's Total Cost Rounded to Nearest \$1,000
From	To	
1-97	1-98	\$40,000
1-98	1-99	\$186,000
1-99	1-00	\$154,000
1-00	1-01	\$122,000
1-01	1-02	\$89,000

Progress Since the Last Five-Year Review -
The SVE system was installed for OU03 and operates and functions as designed. Performance goals were achieved in May 2002 after which restoration activities were initiated. The extraction well (Well D) for OU06 was installed, and has been operating and functioning as designed. Quarterly ground water monitoring and reporting continues. A document discussing the first Five-Years of

Table 4f
Annual System O&M Costs
FAR-MAR-CO Ground Water

Dates		Cost Rounded to Nearest \$1,000	
From	To	EPA's	Morrison Enterprises'
1-97	1-98	\$11,000	\$24,000
1-98	1-99	\$5,000	\$24,000
1-99	1-00	\$22,000	\$21,000
1-00	1-01	\$22,000	\$44,000
1-01	1-02	\$4,000	\$22,000

operation of Well D will be presented to EPA in the fall of 2002 or spring of 2003. This document will evaluate the effectiveness of Well D in extracting contaminated ground water and whether additional extraction wells are needed to capture the plumes from both the North Landfill and FAR-MAR-CO Subsites. A final subsite action ROD will be prepared for both subsites based on this information. For the FAR-MAR-CO Subsite, OU03 and 11 have achieved the performance goals and are determined to be protective. For OU06, the PRPs will present

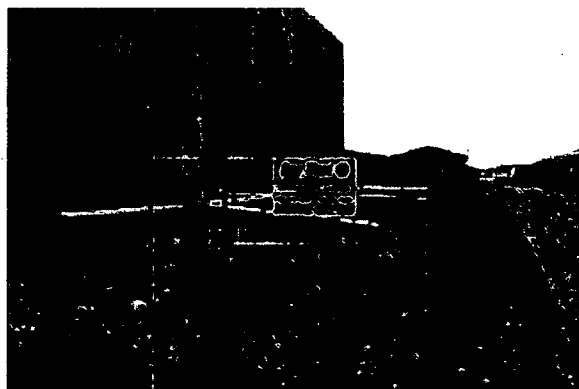


Figure 13
The SVE System at the FAR-MAR-CO Subsite

a report to EPA which will discuss the performance of Well D in controlling the plume and whether the system will achieve MCLs within the next 10 years. The EPA will be able to evaluate the protectiveness of this remedy once this report is received.

F. South Landfill Subsite

Remedy Selection - The South Landfill Subsite is located in the southeast section of Hastings. During the 1960s and 1970s, industrial waste was disposed at the landfill which was owned and operated by the city of Hastings. Contamination at the subsite consists primarily of VOCs. EPA began investigation of this subsite in 1994 with a soil-gas investigation. The results confirmed the presence of industrial solvents in the landfill. Seven monitoring wells were installed during early 1995. Ground water sampling was conducted through 1996. The EPA developed a RI report based on the findings of the investigation and the PRPs wrote the FS.

EPA issued the ROD for the South Landfill on September 29, 2000. EPA's remedy is surface water controls and a landfill cap for soil and landfill contents, and ground water use restrictions and natural attenuation for ground water remediation.

The major components of the selected remedy include:

- regrading of surface areas, installation of a geosynthetic clay liner or other cap.
- implementation of surface water management controls.
- installation of a fence.
- imposition of deed restrictions.
- ground water monitoring.
- bio-chemical evaluation of the ground water regime to determine the

effectiveness and dynamics of natural-attenuation processes.

Preliminary indications suggest that natural attenuation is reducing concentrations of chlorinated VOCs, which are the primary COCs, as ground water migrates away from the subsite. Chemical concentrations appear to be reduced down gradient from the subsite suggesting that natural degradation is occurring.

Remedy Implementation - The city has enacted an ordinance which provides for ground water use restrictions which includes the registration of all existing wells and permits for new wells within the ICA. The ICA is defined as the area beginning at 12th Street and Crane Avenue east of 12th Street to Maxon Avenue, to J Street to Crane Avenue extended to the point of beginning. The comprehensive monitoring of these wells is to be undertaken as part of the ordinance. Implementation signs will be posted and alternate water provided where drinking water wells show contamination of COCs above MCLs. No other components of the remedy have been implemented although the elements that remain will be part of the required work to be performed by



Figure 14
South Landfill Prior to Planned Cap Construction

the responsible parties for the Area Wide Ground Water Action.

Figure 14 is a photo of the South Landfill taken during the Five-Year Review site visit prior to installation of the proposed cap.

System Operation/O&M - The city ordinance which restricts ground water use is in effect. No other components of the remedy are operational. Costs are summarized in Table 4g below.

Table 4g Annual System O&M Costs South Landfill		
Dates		EPA's Total Cost Rounded to Nearest \$1,000
From	To	
1-97	1-98	500
1-98	1-99	2,000
1-99	1-00	300
1-00	1-01	85,000
1-01	1-02	43,000

Progress Since the Last Five-Year Review -

Since the last Five-Year Review was conducted, the RI and FS for the South Landfill OU were completed and approved. The Proposed Plan was issued in June 2000 and the ROD was issued in September 2000. For the South Landfill Subsite, the EPA anticipates that the PRPs will complete the RD and implement the remedy. The EPA will be able to evaluate the protectiveness of this remedy once the remedy is implemented

G. Area-Wide Ground Water Action

Remedy Selection - The selected interim

remedy for the Area-Wide Ground Water Action, as set forth in the ROD, is institutional controls and related actions. These actions include the following components:

- Domestic ground water use restrictions to prevent the installation of drinking water wells in the contaminated area (this would be accomplished through implementation of city Ordinance #3745).
- Installation of warning signs to advise the public that the water in the area may not meet public drinking water standards (also a component of city Ordinance #3754).
- Monitoring compliance with ground water use restrictions to prevent unacceptable exposures (also a component of city Ordinance #3754).
- Conducting an inventory of all existing ground water wells to identify all domestic, irrigation, industrial, and monitoring wells in the ICA.
- Providing an alternate source of water for domestic use to any residences currently relying on private wells within the ICA that are impacted by contamination attributable to the Hastings Site. These activities may include funding the hook-up to the city's public water supply system, providing bottled water, and/or an in-house water treatment system.
- Ground water monitoring of existing domestic, irrigation, industrial and monitoring wells, and the monitoring of any additional wells identified in the ICA.

Remedy Implementation - The city has enacted an ordinance which provides for ground water use restrictions. The ordinance restricts the installation of wells for drinking water purposes in areas suspected of ground water contamination. The city has also collected ground water samples from several private property owners. Analytical results were presented to EPA during the Five-Year Review process and are included in the Appendices. No other components of the remedy have been implemented. Special Notice Letters were sent to the PRPs and EPA is engaged in formal negotiations to implement the remaining components of the remedy.

System Operation/O&M - The city ordinance restricting ground water use is in effect. No other components of the remedy are operational. Expenditures by the responsible parties in the preparation of the FS were not provided to EPA during the Five-Year Review process. The EPA's Area-Wide costs are summarized in Table 4h.

Table 4h Annual system O&M Costs Area-Wide		
Dates		EPA's Total Cost Rounded to Nearest \$1,000
From	To	
1-97	1-98	151,000
1-98	1-99	90,000
1-99	1-00	48,000
1-00	1-01	201,000
1-01	1-02	121,000

Progress Since the Last Five-Year Review - Since the last Five-Year Review was conducted, the RI and FS for the Area Wide

OU were completed and approved. The ROD was issued in June 2001 and Special Notice letters were sent in December 2001. Negotiations with the PRPs are in progress for implementation of the RD/RA. For Area-Wide Ground Water Action, OU19, a protectiveness determination of this remedy cannot be made at this time until further information is obtained. Further information will be obtained by taking the following actions: ground water monitoring samples within the ICA, installation of additional monitoring wells, and identification of all users of ground water within the ICA and sampling their supply wells. It is expected that these actions will be conducted by the responsible parties and will take approximately two years to complete, at which time a protectiveness determination can be made.

H. Naval Ammunition Depot Subsite

The USACE has conducted a Five-Year Review for the NAD and it is Appendix 1. For OU04, the USACE has determined that the remedy is protective.

V. Five-Year Review Process

A. Administrative Components

In January 2002, members of the HGWCS team began coordination and outreach activities for the Five-Year Review in a manner consistent with the requirements of the guidance. Efforts were coordinated through the use of e-mail to all parties who serve as Remedial Project Managers (RPMs) for the site. Those RPMs are Diane Easley - Well #3, the North Landfill and the FAR-MAR-CO Subsites and lead for the Five-Year Review; Darrell Sommerhauser - Colorado Avenue and Second Street

Subsites; Paul Doherty - Area-Wide Ground Water Action and South Landfill Subsite; Victor Lyke - Naval Ammunition Depot Subsite. The following team members assisted in the review:

- Audrey Asher, CNSL, EPA's Regional Counsel responsible for the legal review of the document (913-551-7255)
- Glenn Curtis, Branch Chief, Iowa/Nebraska Branch, Superfund Division, Region VII, EPA (913-551-7726)
- Rebecca Himes, EPA Community Involvement Coordinator (913-551-7253)

In addition, the following representatives from the NDEQ lead the states effort to assist in the process:

- Mike Felix, Remediation Supervisor, NDEQ, (402-471-3388)
- Steve Kemp, Project Manager, NDEQ, State Technical Reviewer (402-471-3388)

In January 2002, a schedule was determined that included the following components:

- Community Involvement
- Document Review
- Data Review
- Site Inspection
- Local Interviews
- Five-Year Review Report Development and Review

B. Community Notification and Involvement

Activities to involve the community in the Five-Year Review process were initiated with a meeting in early January 2002,

between the site RPMs and the Community Involvement Coordinator for the HGWCS. A notice was sent to the Hastings Tribune that a Five-Year Review was to be conducted. This notice was published on January 15, 2002. In February, the state, the city of Hastings, community members, responsible parties, and their contractors were notified of EPA's plans to conduct the Five-Year Review, and that a Public Availability Session was set for March 20, 2002, for the purpose of gathering public input regarding work at the Site. On March 4, 2002, EPA mailed a Fact Sheet to persons involved with the HGWCS. The Fact Sheet contained the announcement of the March 20 Public Availability Session. In addition to the Public Availability Session, the EPA held a technical session on March 20 where approximately 40 project managers and technical support staff of each operable unit discussed the technical details of their subsite work. The attendees included PRPs, their technical representatives, the city of Hastings, and NDEQ, and EPA. Hastings Utilities provided information regarding its establishment of the ICA and discussed the monitoring results from private wells. Information presented to EPA at this meeting is included in Appendix 2.

At the conclusion of the meeting, subsite inspections were conducted at Colorado Avenue, Second Street, South Landfill, North Landfill, and FAR-MAR-CO. During the subsite inspections, EPA sought information concerning the current operational status and the areas where operations could be improved. The site inspection provided all who attended the opportunity to examine the scope of the site and the extent of the area of concern.

The Public Availability Session was held at the Public Library. The EPA provided

information to the newspaper and the local television network regarding the Superfund work in Hastings and the Five-Year Review process. Community members expressed concern regarding the costs of the remedy and the length of time it takes to restore the aquifer. Most in attendance were parties that participated in the technical review session which was held earlier in the day at City Hall.

The completed Five-Year Review Report will be available in the information repository at the Hastings Public Library, Hastings, Nebraska. The notice of completion of this report will be placed in the local newspaper and local contacts will be notified by letter or phone. A brief summary of this report will also be included in EPA's website information.

C. Document Review

This Five-Year Review consisted of a review of relevant documents including O&M records and monitoring data (See Appendix 4 - Document Reviewed). Applicable performance standards and ground water cleanup standards, as listed in the RODs and Action Memorandums for the subsites were reviewed.

D. Data Review

Well #3 - Ground Water and Source Monitoring - A review of the ground water data was presented in EPA's ROD which was released in 2001. The concentrations of the COCs at the Well #3 Subsite monitoring locations are presented in Appendix 5 showing the concentration levels from the results of the quarterly ground water sampling efforts from March 1997 to March 2002. The most recent results show

that the MCL or cleanup standard was not exceeded for CCl_4 , chloroform, and 1,1,1-TCA. The cleanup level was exceeded for TCE and PCE. The sampling of selected monitoring locations continues on a quarterly basis and will continue until MCLs are attained for all Well #3 COCs. Monitoring wells CW-01, CW-06, and CW-03R were abandoned in June 2000. Monitoring wells CW-05, CW-04, CW-11, and CW-12 were abandoned in 2002.

This review indicated that the performance goals have been attained for Plume 1 (CCl_4). The EPA is currently in the verification phase of the work. For Plume 2 (TCE, TCA, PCE, and 1,1-DCE), the monitoring data indicates that the extraction system operating at M-3 will effectively capture and remove the residual contamination. The 2001 ROD established MCLs as the cleanup standard for Plume 2.

Colorado Avenue - Source Control - To date, SVE activities performed by the PRPs have removed more than 2000 pounds of volatile organic chemicals from the soils at the Colorado Avenue Subsite. Ground water samples collected from monitoring wells in the vicinity of the contaminant source areas have shown significant reductions in the contaminant concentrations. These declines can be directly attributed to the activities performed by the PRPs. A May 1999 shallow soils investigation performed by EPA confirmed the need for the Phase II (shallow) SVE system. Plans have been approved by EPA for the Phase II activities; however, Dravo has not initiated the construction activities.

Colorado Avenue - Ground Water - Dravo's Phase 2, in-well aeration (IWA) systems began operation in December 1999. Dravo has collected a minimal number of ground

water samples since startup. Results from the baseline December 1999 and the yearly January 2001 sampling programs are currently available. To demonstrate mass removal from the ground water, Dravo collects yearly influent and effluent vapor samples from the IWA systems. Evaluation of the available information, including sampling by EPA, provides confirmation that Dravo's treatment wells are removing significant amounts of contamination from the aquifer. However, with respect to the ROD goal of plume containment, areas beyond the zone of influence of the Phase 2 system are not being addressed. Therefore, additional ground water treatment actions are needed to fully comply with the goals contained in the 1991 ROD, as amended.

Second Street -The current Second Street removal actions consist of both source area and down gradient ground water removal actions. The source area removal action consists of SVE and ground water pump and treat systems. Throughout the five years of operation (1997-2002) both of these systems have been monitored for contaminant removal performance. The SVE removal system was initially monitored on a quarterly basis and is now monitored semi-annually. The most recent SVE monitoring results obtained from this system (September 2001) demonstrate the continued removal of significant amounts of VOC and benzene, toluene, ethylbenzene, and xylene (BTEX) compounds. Monitoring results for the ground water pump and treat system are also available. Although the most recent results (August 2001) indicate that significant reduction of both BTEX and PAH concentrations is occurring, continued operation of this system will be needed to obtain the interim removal goal of 100 micrograms per liter (ug/l).

Throughout the operation of the source area removal system, the need of additional down gradient response actions was identified from EPA's review of data collected from the down gradient ground water monitoring wells. To supplement the source area ground water removal action, a down gradient ground water removal action was installed. This system consists of two in-well aeration wells situated 700 feet east of the source area and was placed in operation in the summer of 2001. Based on preliminary rounds of data (most recent November 2001), significant contaminant removals were being obtained. The EPA plans to continue semi-annual monitoring of this system.

To supplement the existing down gradient in-well aeration removal action, the need for additional remedial alternatives for treatment of the down gradient ground water (i.e., areas east of Pine Avenue) is being addressed in an FS. The EPA, in consultation with NDEQ and the city, will continue the ongoing analysis of the ground water monitoring data in an attempt to identify a preferred RA alternative for the contaminated ground water migrating eastward away from the source area. The release of this FS is planned for the Summer of 2002.

North Landfill - Ground water monitoring data indicate that the source area is being reduced by natural attenuation processes and that the levels of contamination migrating from the landfill have been reduced. The responsible parties are preparing a report of the ground water monitoring data and operational data for EPA's review. This report will make recommendations concerning the need for further ground water RA.

FAR-MAR-CO - The performance standards were attained in May 2000 for the source control operable unit. The extended period of operation concluded in May 2002. Verification sampling will be performed for the next year and subsite restoration activities will be performed afterwards. The responsible parties are performing quarterly ground water monitoring for the ground water OU. The results show some success in the capture of the plume migrating from the source area. The responsible parties are preparing a report which will demonstrate that the plume migrating from the source area is being captured by the remediation system and will attain MCLs within 10 years, the goal stated in the Action Memorandum.

South Landfill - The ROD was released in 2000. Limited ground water monitoring has been conducted and EPA is not fully aware of the extent of the plume migrating from this subsite. No action has been implemented at the subsite. The parties are discussing which capping alternative will meet the objectives of the ROD.

Cleanup goals established for the COCs are the MCLs or 1×10^{-6} cancer risk level. Additional goals for the subsite action include prevention of further ground water quality degradation by eliminating further leaching of contaminants into the ground water via infiltration of surface water through the landfill contents.

Area-Wide Ground Water Action - The EPA's ROD was released in 2001. Private parties are being notified if their wells are contaminated and will be offered options to consider in order to receive safe drinking water. The EPA will conduct periodic monitoring of ongoing subsite actions to

determine progress toward achieving MCLs in accordance with subsite-specific RODs. Since the selected remedy does not achieve Applicable Relevant and Appropriate Requirements (ARARs), the Area-Wide remedy was implemented as an interim action, consistent with 40 C.F.R. 300.430(f)(1)(ii)(C). The interim action will remain in place until MCLs are achieved at each subsite.

The city of Hastings passed a city ordinance establishing an ICA restricting the use of the ground water within the Area-Wide project area. The selected remedy is designed to be completed with extensive monitoring and full implementation of the city ordinance.

E. Site Inspection

On March 20, 2002, representatives of EPA, NDEQ, the city of Hastings and several responsible parties inspected the following subsites: 1) Well #3, system at M-3; 2) Colorado Avenue, Phase 1 SVE system and the IWA system at Pine Street; 3) Second Street, the SVE and ground water treatment system at the former police station and the air-sparging system at Uncle Neal's Car Wash; 4) North Landfill, the perimeter security fence; 5) FAR-MAR-CO, the SVE system at Cooperative Producers, Inc. and the ground water extraction at Well D; 6) South Landfill, the existing site conditions; 7) Area-Wide Ground Water Action, the analytical results from the sampling of private residents were identified, and a map showing the contaminant levels as well as the sampling dates were received. The map showing this information is attached as Appendix 2.

F. Site Interviews

The following city of Hastings officials were contacted by telephone or in person as part of the Five-Year Review:

- Dave Wacker, Engineer, city of Hastings, 402-461-2331
- Carman Englehardt, city of Hastings 402-461-2339
- Larry Deitrich, city of Hastings 402-461-2302
- Marty Stange, Hastings Utilities, 402-463-1371, extension 251
- Mike Sullivan, City Attorney, 402-462-2119
- Richard Sheehy, Mayor of Hastings
- Joe Peterson, city of Hastings, Manager
- Jack Newlun, Solid Waste Superintendent for Hastings

During the technical session with EPA held at City Hall on March 20, 2002, employees from the city presented the concerns they have in the O&M of the system at Second Street. Information was presented to EPA for consideration in the modification to the treatment system. An exchange of ideas occurred concerning other opportunities to improve the treatment system. The effectiveness and the extent of the capture zone for Well D, the FAR-MAR-CO well, were also discussed. The abandonment of the wells at Well #3 and the equipment at CW-05 were discussed. For the North Landfill, discussions occurred regarding the effectiveness of the landfill to serve as a bioreactor for the North Landfill contaminants. The USACE expressed concern regarding impacts of the city plumes on the NAD. The South Landfill discussion focused on the limited ground water monitoring that had occurred and the pace of the decision concerning the type of cap that will be necessary. Hastings Utilities

presented information concerning its ground water monitoring efforts and a map showing the locations of private well samples, the location of the ICA, the location of the well head protection area, and the signs posted on fences identifying the protection areas (See Appendix 2). Community members expressed concern about the cost of the work as well as the time it takes to restore the aquifer.

Information presented to EPA during this time are contained in Appendix 2.

VI. Technical Assessment

A. Question A: Is the remedy functioning as intended by the decision documents?

Remedial Action Performance - Response actions have been implemented at Well #3, Colorado Avenue, Second Street, North Landfill, and FAR-MAR-CO Subsites. All systems have remained operational as intended with three exceptions. Interruptions occurred at Colorado Avenue, Second Street, and North Landfill Subsites.¹ The source control and ground water remedies in place will continue to operate until they reach performance goals. In the case of removal actions at Second Street, the EPA intends to incorporate these actions into the ROD, as appropriate. The EPA anticipates additional RAs to be implemented at North Landfill, Colorado Avenue, Second Street, FAR-MAR-CO, and

¹ At Colorado Avenue, the system was temporarily shut down awaiting completion and startup of the Second Street SVE system. At Second Street, the ground water treatment system temporarily shut down in order to install an oil/water separator. At North Landfill, the responsible parties are preparing a report which EPA will evaluate if additional response measures are needed to address the ground water contamination.

South Landfill. A final Area-Wide ROD will be issued to establish final clean up goals, subsequent to issuance of all subsite RODs.

System Operations/O&M - System operations procedures are consistent with subsite specific requirements.

Cost of System Operations/O&M - From January 1997 to December 31, 2001, Well #3 Subsite costs were \$928,000; North Landfill Subsite costs were \$682,000; FAR-MAR-CO Subsite costs were \$777,000 (not including the costs for the installation of Well D); Colorado Avenue Subsite costs were \$4,226,000; Second Street Subsite costs were \$4,123,000; South Landfill Subsite costs were \$131,000; and Area Wide Subsite costs were \$611,000. Total costs, (exclusive of NAD costs) expended by all parties and presented to EPA during the Five-Year Review process were \$11,478,000. However, not all PRP costs are known or were provided to EPA.

Institutional Controls - The responsible parties own some of the site property; there are no current or planned changes in land use at any of the OUs which comprise the site. The ICA has been established by the city of Hastings. The ground water monitoring of the private wells within the ICA is being performed by Hastings Utilities with the private parties being notified of the sampling results.

Monitoring Activities - For Well #3, North Landfill and Far-Mar-Co Subsites, ground water monitoring has been conducted on a quarterly basis during the past five years. Summaries of the past quarterly monitoring results are included in the Appendix 5. For the Colorado Avenue Subsite, monitoring for both the source control efforts and the

ground water efforts were presented to EPA during the Five-Year Review and are in Appendix 5. For Second Street, both systems are monitored on a semi-annual basis and are included in Appendix 5. For South Landfill and Area-Wide, limited monitoring has been completed and the information presented on the maps in Appendix 2.

Opportunities for Optimization -

Well #3: No opportunities for optimization or improvement were identified.

Colorado Avenue: The ground water treatment system has not been fully implemented so opportunities for improvement and optimization still remain.

Second Street: Opportunities for optimization exist at Second Street. The EPA is in the process of evaluating areas for improvement. The ground water remedy has not been selected.

North Landfill: The source control remedy remains protective and effective, no optimization opportunities were identified. The ground water remedy has not been implemented. Optimization and improvement work on the existing Well D ground water action (as part of the FAR-MAR-CO removal action) will be presented to EPA in the 2003 report.

FAR-MAR-CO: Source control has been performed with no optimization opportunities identified; ground water - work is being implemented with optimization and improvement work to be presented to EPA in the 2003 report.

South Landfill and Area-Wide Ground Water Action: The remedies have not been fully

implemented. Optimization opportunities will be discussed in the next Five-Year Review.

Early Indicators of Potential Remedy Failure

No early indicators of potential remedy failure were noted during the review. Costs and maintenance activities have been consistent with expectations.

B. Question B: Are the assumptions used at the time of remedy selection still valid?

There have been no changes in the physical conditions of the site that would affect the protectiveness of the remedy.

Changes in Standards and To Be Considered (TBCs) - As the remedial work has been completed, most ARARs for soil-gas contamination cited in the RODs have been met. ARARs that still must be met at this time and that have been evaluated include: the Safe Drinking Water Act (40 CFR 141.11-141.16) from which many of the ground water cleanup levels were derived - {MCLs and MCL Goals}; and ARARs related to post-closure monitoring. There have been no changes in these ARARs and no new standards or TBCs affecting the protectiveness of the remedy.

Changes in Exposure Pathways, Toxicity, and Other Contaminant Characteristics -

The exposure assumptions used to develop the Human Health Risk Assessment include both current exposures (adult and children residents as receptors from three exposures) and potential future exposures (adult and child). There have been no changes in the toxicity factors for the COCs that were used in the baseline risk assessment. These assumptions are

considered to be conservative and reasonable in evaluating risk and developing risk-based cleanup levels. No change to these assumptions or the cleanup levels developed from them is warranted. There has been no change to the standardized risk assessment methodology that could affect the protectiveness of the remedy. The remedy is progressing as expected and it is expected that all ground water cleanup levels will be met within approximately 30 years.

C. Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

No ecological targets were identified during the baseline risk assessment and none were identified during the Five-Year Review; therefore, monitoring of ecological targets is not necessary. No detrimental effect on wetlands were observed. No weather-related events have affected the protectiveness of the remedy. There is no other information that calls into question the protectiveness of the remedy.

D. Technical Assessment Summary

According to the data reviewed, the site inspection, and the interviews, the remedy is functioning as intended by the RODs as modified by Explanation of Significant Differences and amendments and by the Action Memos. There have been no changes in the physical conditions of the site that would affect the protectiveness of the remedy. There have been no changes in the toxicity factors for the COCs used in the baseline risk assessment, and there has been no change to the standardized risk assessment methodology

<p align="center">Table 5 Summary of Issues</p>		
Issue	Currently Affects Protectiveness (Y/N)	Affects Future Protectiveness (Y/N)
Monitoring results indicate plume continues to migrate from Colorado Ave.	Y	Y
Difficulty in maintaining the operation of the system at Second Street	N	Y
Monitoring results indicate that plume from FAR-MAR-CO is not being completely captured by Well D	N	Y

that could affect the protectiveness of the remedy. There is no other information that calls into question the protectiveness of the remedy.

VII. Issues

Table 5 summarizes site issues identified during the Five-Year Review.

VIII. Recommendations and Follow-up Actions

At Colorado Avenue, additional ground water remediation systems are being installed. Ground water monitoring results will evaluate the effectiveness of these additional systems to capture and control the migration from the subsite.

At North Landfill and FAR-MAR-CO subsites, a ground water report will be presented to EPA which will evaluate the effectiveness of Well D in capturing the plume migrating from these subsites. Additional wells may be needed to remediate the site to MCLs within the next 10 years.

At the South Landfill and Area-Wide subsites, the selected remedies have not been fully implemented. The next Five-Year

Review will evaluate the effectiveness of these remedies.

At the Well #3 subsite, attainment of MCLs is being verified for Plume 1. Plume 2 will be remediated using the system installed at M-3. This action is anticipated to last for 15 years.

Table 6 summarizes recommendations and follow-up actions for the six city subsites.

IX. Protectiveness Statements

A. Well #3

OU07, OU13, and OU17- the remedies employed at these OUs are protective of human health and the environment. The remedy at OU18 is considered protective in the short-term because there is no evidence that there is current exposure. Institutional Controls are in place restricting well drilling for the long-term protection.

B. Colorado Avenue

OU01 and OU09 - the remedies at these OUs are expected to be protective of human health and the environment upon completion. However, additional systems will be required to meet the goals of the

Table 6 Recommendations and Follow-Up Actions						
Subsite/ Issue	Recommendation/ Follow-Up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness? (Y/N)	
					Current	Future
Well #3 - CD Negotiations	Sign CD	EPA and Dutton-Lainson		Summer 2002	N	Y
Colorado Avenue - Complete SVE System	Install Phase 2 equipment	Dravo	EPA	Summer 2002	N	Y
Colorado Avenue - Ground Water System	Install Phase 3 and Phase 4	Dravo	EPA	Summer 2002	Y	Y
Second Street - Complete FS	Publish Proposed Plan and ROD	EPA	NDEQ	Summer 2002	Y	Y
North Landfill - Ground Water Report	Complete Ground Water Report	City of Hastings Dutton-Lainson and Dravo	EPA	Summer 2003	N	Y
FAR-MAR-CO - Ground Water Report	Complete Ground Water Report	Morrison Enterprises	EPA	Summer 2003	N	Y
South Landfill - Remedial Design	Complete the Remedial Design	City of Hastings	EPA/NDEQ	Summer 2003	N	Y
Area-Wide - Complete CD Negotiations	Sign CD	Area-Wide PRPs	EPA/NDEQ	Fall 2002	N	Y

ROD. The current systems do not demonstrate that remedy is protective in the long term. The remedy at OU09 is considered protective in the short-term because there is no evidence that there is current exposure. Institutional controls are in place restricting well drilling for the long-term protection.

C. Second Street

OU12 and 20, the remedy selected for OU12 is expected to be protective of human health and the environment upon completion, and in the interim, exposure pathways that could result in unacceptable risks are being controlled. For both operable units, the EPA has not yet selected a final remedy. The remedy at OU12 is considered protective in the short-term because there is no evidence that there is current exposure. Institutional Controls are in place restricting well drilling for the long-term protection.

D. North Landfill

OU02 and OU10, the remedy for OU02 (source control) is protective of human health and the environment. The remedy for OU10 has not yet been implemented. A protectiveness determination of the remedy at OU10 cannot be made at this time until further information is obtained. Further information will be obtained by the receipt of the ground water monitoring report which EPA will receive in 2003. The remedy at OU02 currently protects human health and the environment because there are deed restrictions in place to prevent installation of ground water wells into the contaminant plume and ground water monitoring is being conducted quarterly to determine the migration of the plume from the source area. Once the information regarding the performance of Well D can be assessed,

EPA will be able to make a determination whether unacceptable risks are being controlled.

E. FAR-MAR-CO

OU03, OU11, and OU06 - the remedy installed for OU03 and OU11, source control, is protective of human health and the environment. A protectiveness determination of the remedy at OU06 cannot be made at this time until further information is obtained. Further information will be obtained by the receipt of the ground water report which the responsible parties are preparing for EPA. This report will be received by EPA in 2003 and it will document the effectiveness of Well D in the capture and control of the plume migrating from the site. The remedy is protective in the short-term as there are deed restrictions limiting further installation of ground water supply wells and the monitoring of the water of private residences down gradient of the subsite.

F. South Landfill

OU05, a protectiveness determination of this remedy cannot be made at this time until further information is obtained. Further information will be obtained by taking the following actions: ground water monitoring samples, verification of the quality of drinking water samples within the ICA, installation of additional monitoring wells and identification of all users of ground water within the ICA and sampling their supply wells. It is expected that these actions will be conducted by the responsible parties and will take approximately two years to complete, at which time a protectiveness determination can be made.

G. Area-Wide Ground Water Action

OU19, a protectiveness determination of this remedy cannot be made at this time until further information is obtained. The city's ordinance establishing an ICA and the process for sampling private water supply wells provides an important level of protectiveness. This ICA Ordinance will minimize the potential for the public to access and be exposed to contaminated ground water and provide a level of additional protectiveness relevant to all of the Hastings ground water OUs. It is expected that these actions will be conducted by the responsible parties and will take approximately two years to complete, at which time a protectiveness determination can be made.

X. Next Review

The next Five-Year Review for the HGWCS is required by July 2007, five years from the date of this review. The next Five-Year Review Report will not contain information about the following OUs as they have attained cleanup goals: Well #3, OU7, OU13 and OU17, FAR-MAR-CO OU11.

XI. Other Comments

Work continues at the site under both federal lead and responsible party lead. Ground water monitoring will continue at most subsites and institutional controls (ground water monitoring, deed restrictions and security fencing, and posting of the site) will remain in effect. Interim response actions being performed at the subsites are believed to be consistent with the final remedy for the HGWCS.